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ABSTRACT

Literature on the components of language and basic skills in speech acquisition is reviewed, and specific problems in communicatively disordered children, particularly hearing impaired and multihandicapped hearing impaired children, are investigated. Practical intervention strategies designed to promote intelligibility of spoken language and effective communication are offered. The development of communication skills through a multisensory approach, a musical approach, parental involvement, and peer interaction are suggested for enhancing the speech and language acquisition of hearing impaired children. (SW)

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PRACTICAL STRATEGIES FOR ENHANCING THE SPEECH AND LANGUAGE ACQUISITION OF CHILDREN WITH COMMUNICATION DISORDERS

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Practical Strategies for Enhancing the Speech and Language Acquisition of Children with Communication Disorders.

Introduction

The relationships among language, communication, and speech are inextricably interwoven. Language is a symbolic code to serve the function of communication. Speech is evidently the most common form of language for communication. It is the purpose of this presentation to examine through an overview of the literature on the components of language and basic skills in speech acquisition and to investigate specific problems in communicatively disordered children, particularly related to the hearing impaired and multi-handicapped hearing impaired children. Practical intervention strategies aimed at the intended focus on intelligibility of spoken language and effective communication will be offered. The development of communication skills through a multisensory approach, a musical approach, parental involvement and peer interaction will be suggested for enhancing the speech and language acquisition of these children.

Communication Disorder

Communication or speech/language disorder is a serious interference of the communication process. Eisenson and Ogilvie (1983) indicated that Van Mattum (1980) classified the obstacles to communication more inclusive. The disorders include : (p. 14).

1. receptive, which includes hearing loss and impairment and disorder of auditory processing, and

2. expressive, which includes speech (articulation, voice, and rhythm) and language (phonology, morphology, syntax, and semantics).

Communication involves the receptive and expressive use of knowledge of the language. Communication skills are necessary to interpret the incoming speech signal through auditory and visual channels and to generate a signal through speech articulation (Sanders, 1982). Any dysfunction or impairment will impede the process of effective communication.

The Problem of Concern

Results obtained in many studies testify to the fact that spoken language of hearing impaired are not favourable as the majority of profoundly hearing impaired children go through years of schooling without attaining intelligible speech. The explanation is given to insufficient commitment to the goal of developing oral skills and insufficient training (Houde, 1980).

The problem is reported by Cole and Paterson (1984) and is fully described elsewhere (Jensema, Karchmer, and Trybus, 1978) that "more than half of our school-age hearing impaired children are still rated as less than intelligible". (p. 101). Several authors mention the speech of the hearing impaired with problems such as "inadequate breath control, excessive and inappropriate pause, inappropriate pitch and intonation, hypernasality, excessive tenseness, inappropriate duration of both stressed and unstressed syllables, and omission or misarticulation of some phonemes." (p. 101)

Somehow the mentioned speech problems of the hearing impaired are regarded by Ling (1976) as remediable or avoidable problems. Therefore,

"It may be concluded that teachers do not have or are not using strategies which integrate current knowledge with compatible, traditional procedures." (p. 17-18)

This assertion, indicated by Cole and Paterson (1984) and reported elsewhere by Hochberg, Levitt, and Osberger (1980), was evident in a 3-year (U.S.) nationwide project for improving speech services to hearing impaired children. The reasons given for minimal progress of speech teaching were:

"Limited expectations for the children's speech and inadequate pre-service training in speech training. Although 80% of the classroom teachers felt speech-training was important, only 42% of the teachers spent as much as 6 to 20 minutes per day on speech development, and 30% spent between 1 and 15 minutes per day on speech maintenance. Approximately 37% and 45% of the teachers provided no speech development or maintenance (respectively) at all." (p. 102)

However, Ling (1982) stated three likely explanations for normally intelligent, hearing impaired children's failure to use clear spoken language:

"First, that language has not been adequately established; second, that motor speech skills have not been developed to sufficiently automatic levels for generalization to occur and third, that phonology has not been fostered through the integration of language and speech training." (p. 105)

With these possible explanations in mind, let us refer to the components of language and basic skills in speech acquisition in order to identify the specific problems of the hearing impaired and multi-handicapped hearing impaired children.

The Components of Language and Basic Skills in Speech Acquisition

It is emphasized by Eisenson and Ogilvie (1983) that "language is the tool which makes the communicative act work." (p. 1) The components of language are illustrated in the diagram to show that language operates within a context. The listeners are influenced by the particular components of the language of the message and in turn making the choice of these components. These components include: phonological, morphological, syntactical, suprasegmentals or prosody, pragmatic, and semantic.

Basic skills in speech acquisition are suggested by Mori and Masters (1980) that the development of speech can be viewed as occuring in three phases: (p. 108-109)

1. Inner language.
   Word meaning must be acquired before words can be used meaningfully. Experience is required to establish word meaning. Thus, inner language is involved with the processes of transformation of experience into symbols to facilitate thinking and communication.

2. Auditory receptive skills.
   The ability to comprehend the spoken language is involved. This is a reciprocal relationship between reception and expression. That is input precedes output. We must understand a word before we can use it meaningfully in communication. The major skills of receptive language include perception of sounds, syntactic and grammatical structure, and following directions (memory and sequence).

3. Auditory expressive skills.
   When comprehension of the spoken language is established, auditory expressive language in communication with others is possible. The ability to use receptive language directly influences the expressive language. The common ways are pointing, signing, speaking and gesturing. The major subskills of auditory expressive language include expressing speech sounds, formulating words and sentences, and selection.

Since we have the insight of the components of language and the basic skills in speech acquisition, the specific problems of these children in these areas must be identified.

The Impact of Hearing Impairment on Speech and Language Acquisition

Some important effects of hearing-impairment on speech

perception and language processing are indicated by Sanders (1982):

Language Development: The primary effect of hearing-impairment is to reduce the amount of auditory information, resulting in the reduction of the hearing impaired person's awareness of the world around him. Deprivation of exposure to spoken language results in a delay and a deficit in language development, particularly during the optimal periods in the child's early life. The most serious effect of prelingual deaf is on the development of the comprehension and use of verbal language.

Auditory Discrimination: Hearing-impairment results in a distortion of incoming auditory signals, because a hearing loss always affects the overall loudness of the input signal, and the perceived frequency spectrum. A congenital hearing impaired child will be hampered not only by the limited ability to make use of the distorted acoustic signal, but also by the retarded acquisition of language skills. As a result of these two limitations, the redundancy of information or message signal is greatly reduced.

Speech Perception: As the relationship between language and speech is so closely related, prelingual deaf children with reduced language abilities are in a position of double jeopardy. They are not able to make adequate predictions on the information of the incoming message, so they are forced to depend on the very acoustic signal which is so distorted due to hearing impairment.

Memory Processing: The understanding of spoken language depends on several critical requirements. The perceptual system has to be sensitive enough to obtain the physical cues that include the acoustic signal and the visible speech articulation patterns. The reduction of auditory or visual input will affect the information received, and consequently the ability to reconstruct the message and meaning necessary to learn and remember the auditory information. This difficulty is found in the retarded vocabulary development of the hearing impaired. The reason being that distortion of the acoustic signal by hearing-impairment, with the resulting reduction of redundancy affects short-term recall of learned items. This is so because the ability to learn and remember depends on restructuring information out of echoic memory. The ability to segment the acoustic signal into meaningful units is an essential prerequisite to the restructuring of information from echoic to short-term memory. The process involves translating acoustic data into linguistic data. One can learn and remember what one can restructure.

Hearing impaired children receive less acoustic information and have inferior linguistic rules by which the acoustic patterns can be restructured into language code for memory storage. The impact of hearing-impairment on learning and remembering is that the information entering echoic memory is reduced, so pattern identification and differentiation become difficult. Further, the distorted acoustic models of spoken language received prevents the child from learning the rules for processing language. Therefore, the hearing impaired children are deprived of adequate language rules for segmenting the acoustic signal, chunking, and restructuring the information. Consequently, they have difficulty in understanding and remembering.

The effect of noise on learning and memory: The listening conditions of the learning conditions of the learning environment for hearing impaired children are important. Increased effort is required for speech comprehension and auditory learning skills under poor listening conditions since auditory input will be greatly reduced and distorted. Two deficiencies arising from hearing-impairment are mentioned by Berg (1976) - speech misunderstanding and defective speech. These are the receptive and expressive forms of speech communication. Ross, Brackett, and Maxon (1982) indicates that the hearing impaired child's perception of speech sounds shows the same kind of errors manifested in his production. Regarding speech perception, the hearing impaired are faced with acoustic or linguistic deficiencies so they require the basic acoustic/phonetic components of speech to resolve their ambiguity. Erber (1980) also shared this viewpoint that speech errors seem to be a function of the impaired perception. However, careful auditory management can reduce the impact of the problem.

The effect of multi-handicapping conditions: Clinical observations reported by Stremel-Campbell (1982) that mentally handicapped children make more errors of omission than substitution or distortion, therefore, their speech is often unintelligible. This problem of the hearing impaired mentally handicapped children will be discussed in the section of communication skills training.

Practical Intervention Strategies

The Rationale

The hearing impaired and multi-handicapped hearing impaired children will experience a communication handicap. It is suggested by Sanders (1982) that:

"It is the aim of habilitation/rehabilitation procedures to develop compensatory strategies to reduce the impedance between the individual and the large communication matrix into which the person must fit." (p. 15)

An individualized intervention programme based on the analysis and interpretation of assessment data should be established to solve the problem encountered and to meet the specific needs of the child. Language and cognition form the basis of speech comprehension, so the approach should help the child to learn conceptual and language skills (Sanders, 1982). Moreover, Ross, Brackett and Maxon (1982); Buckler (1980) stress the need to capitalize fully on the child's residual hearing. Therapeutic intervention in the speech and language areas should proceed simultaneously with auditory management.

Teaching Strategies

Teachers need to understand the child's ability to learn. A meaningful profile of the child's communication and learning is useful. Assessment of the child's competencies is necessary for the teacher to understand the nature of the child's difficulties in order to select intervention strategies to meet his needs. The following stages of intervention strategies are suggested by Sanders (1982):

1. Identify those basic concepts relative to the child's environment with which he or she is not yet familiar.

2. Plan to increase general functional vocabulary.

3. Increase subject-specific vocabulary.

4. Teach or correct missing or incorrect grammar and syntactic structure.

The word is the basic unit of language, so it is at the word level that motor speech and language skills can be integrated. The use of function words is the key to the development of syntax essential for language development. Ling (1982) states that:

"Through the association of phonologic patterns and function words, speech can be made to enhance language and language can be used to reinforce speech." (p. 112)

Further Ling (1982) suggests that teachers should stimulate the use of the sensory modalities in teaching children for reception, production, and feedback, in real life; to promote interaction and motivate an environment for speaking.

Power (1982) has remarked that the reason why traditional approaches to teaching language to hearing impaired children often have not been successful is because most teachers tend to teach language as a subject in the school curriculum. It is necessary for teachers to seek a pedagogy for fostering the acquisition of language as in functional subjects, so that hearing impaired children will remember what they have learned. Learning in "authentic transactional environments" is the key to such a pedagogy.

It is noted by Norlin (1981) that: "children consolidate a multi-dimensional communicative system, consisting of meaning (content), structures for coding that meaning (form), and options for the choice of those structures in varying situations (use)". (p. 90) It is stated by Bess and McConnell (1981) that the primary form of symbolic language communication is spoken language which develops sequentially from many heard language experiences. The components of spoken language include phonemic, morphologic, syntactic, semantic, and prosodic patterns. It is proposed that hearing impaired children must learn a system of communication, and the acquisition and integration of all the components of this system. If the children can be taught to utilize contextual cues, in addition to acoustic information, they may achieve more efficient language acquisition.

Solutions to the Problem of Concern in Speech Teaching

Even with a commitment to a language-based intervention model, there is still a place for analytic speech training (Sanders, 1982). The essential concept in working on speech with hearing impaired children is to achieve intelligibility and spontaneous oral language (Ling, 1979). Undoubtedly, teachers have to spend tremendous efforts and time to achieve these goals. In terms of time allocation, Cole and Paterson (1984) suggest that:

"The teacher's primary preoccupation needs to be with facilitating the growth of oral language in meaningful situations. Building speech intelligibility into such a programme requires consistent overall expectations for maximum clarity, as well as planned occasions for both incidental and scheduled motor speech practice." (p. 103)

Teachers, particularly in the secondary schools, often set their priority for academic growth of their students. Time allocation for speech training is difficult. Therefore, speech teaching can be incorporated into various academic subjects and planned activities such as literature performance, drama, concerts, creative dance and so on.

The Multisensory Approach

To help a hearing impaired child reach his potential in speech perception, we should consider the possibilities of each available sensory system such as auditory, vibrotactile, visual, and combined modes. (Erber, 1981). This is echoed by Lieberth (1982) that:

"Speech is a visuo-motor-kinetic activity. Perception and production of speech require the use of all modalities, each developed to the maximum level (French, 1971, p. 212)." "This is the underlying theme of the methods of teaching speech classified as multisensory. Touch, speechreading, audition, and representations of speech are used in various combinations to develop receptive and expressive oral language. Speech production is dependent on, and shaped by, speech perception. The perception of speech is seen as the utilization and integration of the total sensory features of the sound (Calvert and Silverman, 1975, p. 159)." (p. 246)

Utilization of Auditory, Visual and Tactile Senses

A profoundly hearing impaired child can be taught to use the output of a vibrator to compare the speech qualities of the instructor's model. This technique is most effective for correcting those gross aspects of speech such as intensity patterns as in rate of syllable production. It is also useful for distinguishing differences between speech sounds (Erber, 1980). Tactile sensation as a form of feedback which is regarded by Ling (1978) as most important to those hearing impaired children who are not able to hear certain sounds. Touch can be used to help speech reception. Two forms of tactile cues are available: (1) amplification system which incorporates a vibratory output, (2) direct touch. The device such as Mono or Poly-Fonator can increase awareness of sound for a profoundly hearing impaired child, and facilitate the discrimination of sounds that differ in intensity and duration.

In addition to the use of a Mono-Fonator, the writer has introduced the use of a quartz metronome for rhythm training, syllable discrimination, rate of syllable production, and syllable practice through visual (red and green light signals) and auditory (high and low pitched tones) input. Syllable practice can readily be transferred into words and sentences.

The visual speech aid, which is a microcomputer-based system, has recently been developed by the Software Research Corporation of the University of Victoria, in British Columbia, Canada, to fit into speech training programmes. This aid

provides displays of pitch contours and some segmental contrasts. It is also a motivator for reinforcing those initial efforts at using voice for communication and model voice characteristics. It can be utilized to teach rhythm, pitch and amplitude with visual displays.

Integration of Auditory and Visual Training with Speech and Language

The acoustic and visual speech signal constrain help the listener in reconstructing the linguistic message. Therefore, the first goal is to optimize the child's use of the auditory information received. Paterson (1982) noted that:

"The use of audition is the fastest, easiest, and most direct means of acquiring spoken language. It is auditory input in the presence of communicative experience which plays the primary role in the speech and language development of hearing impaired children." (p. 261)

Appropriate training can improve auditory behaviour, auditory language processing, and auditory perception. A language-based approach to auditory-visual training is recommended (Sanders, 1982). The need for auditory training of young hearing impaired children should be linguistically based (Kretschmer and Kretschmer, 1978). The child's ability to make prediction about the language content of the signal will depend on sufficient information for comprehension. As auditory information through residual hearing and amplification may not be sufficient for comprehension, it is essential to train the child to develop the integration of visual cues to speech into the total-information pattern (Sanders, 1982).

Enhancing Speech and Language Through Music and Movement

Music can be perceived by hearing impaired children. According to Dale (1970), it is generally known that hearing for the low pitched tones is usually better than that for the higher ones. Most hearing impaired children have measurable hearing at 250 H_Z, and below this frequency. Some may have up to 500 H_Z. Middle C on the piano has a fundamental frequency of 256H_Z. The C below this has a main frequency of 128 H_Z and the one above middle C of 512 H_Z. Therefore, the melodies of many tunes, particularly nursery rhymes, can be heard by many hearing impaired children provided with adequate amplification.

The rationale of using music and rhythmical movement is

that learning the words of the songs is good practice for reading and vocabulary expansion. The words also provide interesting and useful material for speech improvement work. Making up play-songs or actions facilitate speech and language development in a meaningful situation in which children enjoy their participation. Furthermore, these musical activities provide excellent opportunities for them to express emotions. The use of musical notations to show length of the various syllables, and pitch modulation is most effective on the rate of utterance, phrasing and rhythm of speech. This can contribute a marked effect on speech intelligibility (Dale, 1970). It is also indicated by Sanders (1982) that in addition to phonemic identification, information important to meaning is also conveyed by stress patterns and rhythm of speech.

The basic reasons why teaching hearing impaired children to learn rhythm, ballet and pantomime are given by Arnold (1982). Rhythm is aural, visual and tactile. The form of movement is regulated by the arrangement of musical patterns of accents and duration value. By clapping the various rhythms, the tactile and visual elements enhance one another. These rhythm patterns of movement generalize to the rhythm patterns of speech. To learn rhythm through dance such as ballet is enjoyable. It is remarked by Van Uden (1970) that:

"The phrase structure of sentences is basic in the whole rhythmic structuring of sentences, as we need dancing and music together with language" (p. 49).

Rhythm analysis is presented by Winters (1975) who explains that rhythm is perceived as unit grouping in the brain. In order to perceive, strengthen and recall these units, using strategies in vocalization, beating the repetition of rhythm through kinesthetic sense, and meaningful movement may be involved. The division of beats for a rhythmic pattern can be facilitated by vocalization of each beat using numbers, nonsense syllables, or words. When the child has mastered some speech and can read somewhat, the method introduced by Van Uden (1970) can be used to indicate the utterances which contain an accent of contrast, because this is important for the development of meanings and understanding.

The resemblance between the construction of a music language and of a verbal language makes music a very important aid in speech therapy. The perceptual and mental process are involved in hearing, remembering, and imitating the sounds heard, together with the motor control of the necessary physical movements. Music activity and active listening to music can produce functions supporting the acquisition of speech and language. Speech training and language stimulation through

music is to improve the voice levels and qualities of the child, and to teach the accentuation in intensity, duration, pitch and intonation (Bang, 1982)

It is described by Sanders (1982) that "speech is a melodic phenomenon" (p. 50). We perceive the speech variation in frequency, intensity, and rate as continuous changes in pitch, loudness, rate and stress. These prosodic characteristics are known as suprasegmental components whereas vowel and consonant units are identified as segmental.

Research findings on speech intelligibility of the hearing impaired child have indicated that suprasegmental features of speech such as intonation and rhythm play a more important role in the child's speech intelligibility than correct articulation of individual sound (Ben-Zivi, 1982). Therefore, training activity suggested by Paterson (1982) improves the ability to determine whether a sentence is a question, statement, or command by listening for suprasegmental information such as intonation pattern, stress, duration, and intensity cues which provide essential contextual cues for comprehension. It is supported by Sanders (1982) that:

"The basic function of the suprasegmental patterns is to establish constraints that facilitate the identification of segmental cues. The rhythm pattern of speech serves to identify the highly encoded and, therefore, highly informative stressed syllable for early decoding." (p. 51)

Many hearing impaired children are capable of learning to play band and orchestral instruments, particularly those with more resonance (Nocera, 1979). The principle of gaining awareness and control of sound through feedback mechanisms is emphasized by Michel (1976). The "blow organ" is structured for improving breath control for vocal sounds. The use of "Sonar Tone Bars" with specific acoustic vibratory qualities for voice-speech therapy is reported by Bang (1982). In view of all the mentioned aspects, music and movement play a significant role in enhancing speech and language.

Developing Communication Skills and Parental Involvement

In recent years, many studies have shown that mothers are the important source of linguistic input to their children providing the modification of speech which facilitates language acquisition (Cross, 1978). The research findings of Snow, (1977) indicated the importance of maternal interaction regarding individual differences and appropriate styles. Evidently, it is generally agreed that the child needs a language model (Clezy, 1979). Parents are usually in a

unique position to teaching the hearing impaired child through daily opportunities at home (Dale, 1976). One strategy for the appropriateness of language addressed to hearing impaired children is suggested by Seitz and Marcus (1976) that teaching mothers direct their communication to the child's activities and interests, as do mothers of normally developing children.

Recent theoretical explanations of early language acquisition have suggested that the key factor in the language acquisition process is the interaction between the child and the primary care-giver (Price, 1984, also reported elsewhere by McLean and Synder-McLean, 1978).

A research study was carried out to investigate the verbal interaction strategies used by mothers in interaction with their young developmentally delayed children. The pattern of verbal interaction strategies using an initiation-facilitation-feedback framework was applied. Tentative evidence for changing patterns of strategy usage was found from sound imitation to the two-word-level of early language acquisition skills. Research with developmentally delayed children showed that mentally handicapped children experience difficulty in acquiring language and communication skills and that exposure to a normally stimulating environment is inadequate. Several studies have reported success using a more structural approach, within an environmental framework and using parents as language trainers (Price, 1984, also reported elsewhere by McDonald, 1976, Bochner et al, 1980). It is evident that care-giver-infant interaction is the key factor for the development of communication skills and ultimately language acquisition of the child. Therefore, parental involvement is imperative in the process of speech and language acquisition of exceptional children.

Communication Skills Training

The difficulties of the hearing impaired mentally handicapped child are compounded by the combination of both handicaps. The goals in communication skills of these children must be a function of the capabilities of each child. These capabilities affect the choice of an appropriate mode of communication. Those who have severe learning problems often use a combination of oral and manual communication. Those with moderate to mild learning handicaps may be able to learn limited oral skills of communication. Whatever mode of communication is used, the training of prelinguistic behaviour is crucial in language development. It is essential to get eye contact and attention of the child to imitate the development of meaning. Further, the child must have

an experiental base to develop meaning. The child can learn through symbolic play to communicate wants, needs, and ideas. It is most effective to use the child's environment as a tool in language training. Strategies that may be used are motor imitation, sound imitation, and play imitation. But such imitation must be related to meaningful situations. When gestures are used, they must be accompanied by verbal utterances, including intonation and appropriate stress for normal communication (Mavilya, 1982).

There are four modes of communication in working with hearing impaired mentally handicapped children. These include the vocal mode (speech), the manual mode, the graphic mode, and the symbol system mode. It is likely that at one time or other, each of these modes will be utilized, either separately or in coordination with another (Moores, 1982). The most common ways of communication in this population are pointing, signing, speaking, and gesturing. Most language programmes utilize various types of imitation to teaching communication. Among educational strategies, a simple nature gesture system is recommended by Mavilya (1982).

Types of communication with the deaf-blind child include signal, gestures, class cues, gross signs, fingerspelling, speech, and print-braille. The strategy employed is through co-active participation (McInnes and Treffry, 1982). The communication process and teaching strategies for this population require detailed explanation. Therefore, it is beyond the scope of this presentation to discuss further.

Regardless of what mode of communication is chosen, the process is a long-range one requiring the cooperation and interaction of professionals and parents (Mori and Masters, 1980). Language activities in the context of meaningful interaction rather than in formal drill is recommended by Naiman (1982).

Peer Interaction and Tutoring

According to various studies mentioned by Hartup (1978) that peer relations are necessary and important in child development, particularly in contributing to the acquisition of social and communicative skills. The play of children in their daily experience is an essence of child to child interaction which provides the child with social situations in their own way that facilitate social learning. Current evidence shows that without an opportunity to interact with other children, children have difficulty in learning effective communication skills.

Peer modeling can influence many aspects of the child's life. Mostly it occurs under informal conditions (Hartup, 1978). Other research work has also indicated that handicapped children acquire speech through language learning behaviour of the non-handicapped peer. (Guralwick, 1976)

The utilization of peer tutoring has gained new popularity in recent years. It is suggested by Hartup (1978) that the utilization of children as agents in their own socialization should be a key consideration in planning various early intervention activities, particularly those involved with the integration of handicapped and non-handicapped children.

Peers are regarded by Lowenbraun et al (1976) as excellent sources of direct-instructional tutoring. One of the many ways of pairing peer tutor and tutee consists of a pupil who is at the initial stage of a skill and a peer tutor who has the proficiency of the skill. This pairing system provides the tutee valuable input whereas the tutor the needed practice. This seems most ideal for handicapped children to learn from non-handicapped children through peer-interaction and/or tutoring.

Conclusions

The development of an organized speech and language programme must be based on an appropriate assessment in order to plan intervention strategies. We must have demanding yet attainable objectives and utilize a variety of practical and effective strategies and techniques available. Through the knowledgeable and skilled teachers, involvement of parents, interaction of peers, and an environment to generate meaningful situations for effective communication, are all essential components for enhancing the speech and language acquisition of children with communication disorders.

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